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EXAMINER	
VERDIER, CHRISTOPHER M	
ART UNIT	**PAPER NUMBER**
3745	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/064,470	COUTANDIN ET AL.	
	Examiner	Art Unit	
	Christopher Verdier	3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18 and 20-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17 and 20-23* is/are rejected.

7)☒ Claim(s) *18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *2-28-03, 7-1-04* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Applicants' Amendment dated July 1, 2004 has been carefully considered but is deemed non-persuasive. Claims 1-18 and 20-23 are pending. The replacement drawing sheet of figure 8 is approved. No drawing objections remain. The specification has been amended to correct the informalities set forth in the first Office action. The examiner' suggested claim language has been adopted. The Applicants' argument that claims 14-15 and 18 are definite has been carefully considered and is persuasive. The rejection of claims 14-15 and 18 under 35 USC 112, second paragraph is withdrawn. Correction of the above matters is noted with appreciation.

With regard to Pyne, Jr., Applicant has argued that amended claim 1 defines over Pyne, because Pyne teaches that ribs 13A, 14A, and 21A regulate the flow and are not turbulence generator means, and that the ribs are not disposed along the inner and outer wall of the cooling ducts, but are rather positioned at two distinct locations. These arguments are not persuasive, because although the specification (page 3, lines 7-8) of Pyne states that the ribs may be formed on the sidewalls or insert walls, figure 2 of Pyne clearly shows that the ribs 13A, 14A, and 21A are formed on both the inner wall 21 and the outer wall 14. With regard to Applicant's argument that ribs 13A, 14A, and 21A regulate the flow and are not turbulence generator means, this argument is not persuasive, because ribs 13A, 14A, and 21A project into the coolant flowpath and interrupt smooth flow, hence generating turbulence. With regard to Applicant's argument that the examiner has indicated that ribs 13A, 14A, and 21A are means for regulating the flow rate as well as turbulence generator means, the claims do not specifically recite that the means for regulating the flow rate and turbulence generator means are separate elements, and the ribs perform both of these functions.

With regard to Suzuki, Brockmann, Morrison, and Ito, the examiner agrees with Applicant that these references do not disclose that the cooling ducts comprise turbulence generator means distributed along the inner wall defining the cooling ducts, however Pyne teaches this feature. In addition, Moore discloses/teaches the feature of the cooling ducts comprising turbulence generator means distributed along the inner wall defining the cooling ducts.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 20-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 20 recites that the turbulence generator means are supported by at least one of the inner wall or the outer wall. Claim 21 recites that the turbulence generator means are provided in at least one of the inner wall or the outer wall. However, both these claims depend from claim 1, which recites that the turbulence generator means is distributed along both the inner and the outer wall. Therefore, claims 20 and 21 contradict the requirement in claim 1 that the turbulence generator means is distributed along both the inner and the outer wall.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4-5, 12, 14-16, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Pyne, Jr. 3,574,481. Note the double-wall blade for a turbine, the blade comprising a streamlined lateral wall 10 extending along an axis, surrounding said axis, and in turn comprising an inner wall 21 and an outer wall 14 facing and integral with each other; and channeling means (the interior of 21) for a cooling fluid, comprising an intake cavity 25 for intake of said cooling fluid into said blade and a number of cooling ducts (between adjacent elements 18) formed between said inner and said outer wall and tangentially to said inner and said outer wall; with the cooling ducts extending in respective directions crosswise to said axis and parallel to one another, each being airtight with respect to an adjacent duct, and have respective unnumbered intakes separate from one another and communicating with said intake cavity so as to each guide a relative flow of said cooling fluid, which does not mix with the flow in the adjacent duct. The cooling ducts comprise turbulence generator means 13A, 14A, and 21A distributed along both the inner wall and the outer wall. The channeling means additionally comprise means 13A, 14A, and 21A for regulation of the flow rate in order to diversify the flow rates of said flows from one another. See column 3, lines 1-15. The means for regulation of the flow rate comprise for each said intake, an unnumbered corresponding hole which has a cross-section of passage

calibrated in order to put the corresponding said cooling duct into communication with said intake cavity. The streamlined lateral wall 10 can be accommodated in an annular duct of said turbine, and it inherently comprises an unnumbered pair of radially spaced apart end walls which are disposed at the opposite axial ends of said streamlined lateral wall, transversely to said axis and in use can be connected to respective platforms which delimit said annular duct, with the channeling means comprising openings 17 which are provided through the end walls. The openings 17 communicate with the intake cavity through the cooling ducts, and the channeling means comprises a first chamber near 21 delimited by the end walls, by the inner wall, and by a rearward wall near which separates the intake cavity, with the first chamber connecting the cooling ducts and openings 17. See column 3, lines 37-42. The channeling means also comprise at least one passage 23 which is provided in a tail portion of said blade and opens along a trailing edge 12 of said streamlined lateral wall, said cooling ducts having respective unnumbered outlets which open into said passage. The turbulence generator means 13A, 14A, 21A are in the form of a number of ribs which are supported by at the inner wall and outer wall and are transverse to a direction of advance of said flows. The recitation in claim 1, lines 1-2 of "particularly for aeronautical applications" is a recitation of intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Similarly, the recitations in claim 12 that the lateral wall "can be accommodated

in an annular duct of said turbine", and that the end walls "in use can be connected to respective platforms which delimit said annular duct" are recitations of intended use.

Claims 1, 4-6, and 8-15, and 20-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Moore 3,246,469 (figures 1-3). Note the double-wall blade for a turbine, with the blade comprising a streamlined lateral wall 2/8 extending along an axis, surrounding said axis, and in turn comprising an inner wall 16 and an outer wall 6 facing and integral with each other; and channeling means (the interior of insert D1) for a cooling fluid, comprising an intake cavity near 22 for intake of said cooling fluid into said blade and a number of cooling ducts 12 formed between said inner and said outer wall and tangentially to said inner and said outer wall; characterized in that said cooling ducts extend in respective directions crosswise to said axis and parallel to one another, are each airtight with respect to an adjacent duct, and have respective intakes 18, 20 separate from one another and communicating with said intake cavity so as to each guide a relative flow of said cooling fluid, which does not mix with the flow in the adjacent duct. The cooling ducts comprise turbulence generator means 16, 12 distributed along both the inner wall and the outer wall. The channeling means additionally comprise means for regulation of the flow rate 18, 20 in order to diversify the flow rates of said flows from one another, with the means for regulation of the flow rate comprising for each said intake, a corresponding hole 18, 20 which has a cross-section of passage calibrated in order to put the corresponding said cooling duct into communication with said intake cavity. The means for regulation of the flow rate are interposed between said intake cavity and said intakes. The intake cavity is an axial cavity which is delimited by said inner wall, said intakes being provided through said inner wall

along at least one axial row, with the streamlined lateral wall having a leading edge near 6, a trailing edge near 28, and a side 2 which is subjected to pressure and a side 8 which is subjected to low pressure which extend between said leading edge and the trailing edge, with the axial row of said intakes being provided adjacent said leading edge. The cooling ducts comprise first ducts provided along said side which is subjected to pressure and second ducts provided along said side which is subjected to low pressure, and means for separation 22 being provided between said first duct and second duct in order to define first intakes in said first duct and second intakes in said second duct. The means for regulation of the flow rate comprise first and second holes 18, 20 which have a calibrated cross- section of passage and are each associated with a respective corresponding said first intake and with a corresponding said second intake. The streamlined lateral wall can be accommodated in an annular duct of said turbine, and it inherently comprises a pair of end walls which are disposed at the opposite axial ends of said streamlined lateral wall, transversely to said axis and in use can be connected to respective platforms which delimit said annular duct, with said channeling means comprising unnumbered openings which are provided through at the end walls. The openings communicate with the intake cavity through the cooling ducts, and the channeling means comprises a first chamber near 21 delimited by the end walls, by the inner wall, and by a rearward wall near which separates the intake cavity, with the first chamber connecting the cooling ducts and openings 17. The channeling means comprise a number of said openings for each said end wall. The turbulence generator means comprises both a number of ribs (unnumbered but shown generally at 16, 12) and a number of incisions (unnumbered, but shown generally at 16, 12 between the ribs) on both the inner wall and the outer wall and transverse to the direction of advance of the flows.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4-9, 12, 14-17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki 4,697,985 in view of either (Pyne 3,574,481 or Moore 3,246,469). Suzuki 4,697,985 (figure 1-3 and 6) disclose a double-wall blade for a turbine, with the blade comprising a streamlined lateral wall 11 extending along an axis, surrounding said axis, and in turn comprising an inner wall 12 and an outer wall 11 facing and integral with each other; and channeling means 19/31a for a cooling fluid, comprising an intake cavity 18 for intake of said

cooling fluid into said blade and a number of cooling ducts 14 formed between said inner and said outer wall and tangentially to said inner and said outer wall; characterized in that said cooling ducts extend in respective directions crosswise to said axis and parallel to one another, are each airtight with respect to an adjacent duct, and have respective unnumbered intakes separate from one another and communicating with said intake cavity so as to each guide a relative flow of said cooling fluid, which does not mix with the flow in the adjacent duct. The channeling means additionally comprises means 31a for regulation of the flow rate in order to diversify the flow rates of said flows from one another, with the means for regulation of the flow rate comprising for each said intake, a corresponding unnumbered hole which has a cross-section of passage calibrated in order to put the corresponding said cooling duct into communication with said intake cavity, with the means for regulation of the flow rate being interposed between said intake cavity and said intakes, and the means for regulation of the flow rate comprising an additional element (the unnumbered boss) which is connected integrally to said inner wall, with the holes being provided in the additional element. Concerning claim 8, the intake cavity may be considered as the interior of wall 12 and is an axial cavity which is delimited by said inner wall, with intakes 19 being provided through said inner wall along at least one axial row. The streamlined lateral wall has a leading edge 11a, a trailing edge 11b, and a concave side which is subjected to pressure and a convex side which is subjected to low pressure which extends between said leading edge and the trailing edge, with the axial row of said intakes 19 being provided adjacent the leading edge. The streamlined lateral wall can be accommodated in an annular duct of said turbine, and in it inherently comprises a pair of end walls which are disposed at the opposite axial ends of said streamlined lateral wall, transversely to said axis and in use can

be connected to respective platforms which delimit said annular duct, with the channeling means inherently comprising openings which are provided through at least one said end wall. The openings communicate with the intake cavity through the cooling ducts, and the channeling means comprises a first chamber near 12a delimited by the end walls, by the inner wall, and by a rearward wall near which separates the intake cavity, with the first chamber connecting the cooling ducts and openings. The channeling means also comprise at least one passage 16 which is provided in a tail portion of said blade and opens along a trailing edge 11b of said streamlined lateral wall, with the cooling ducts 14 having unnumbered respective outlets which open into said passage. As seen in figure 6, said passage is delimited by said outer wall and accommodates a number of heat exchange elements 35 which project from said outer wall. The recitation in claim 1, lines 1-2 of "particularly for aeronautical applications" is a recitation of intended use as set forth above. The recitation in claim 12 that the lateral wall "can be accommodated in an annular duct of said turbine", and that the end walls "in use can be connected to respective platforms which delimit said annular duct" are recitations of intended use.

However, Suzuki does not disclose that the ducts comprise turbulence generator means distributed along the inner wall and the outer wall defining the cooling ducts, with the turbulence generator means comprising a number of ribs that are transverse to a direction of advance of the flows.

Pyne shows a cooled turbine blade having cooling ducts (between adjacent elements 18) comprising turbulence generator means 13A, 14A, and 21A in the form of ribs distributed along

both the inner wall 21 and the outer wall 14, which are transverse to a direction of advance of the flows, for the purpose of varying the flow of cooling medium. Moore shows a cooled turbine blade having cooling ducts 12 comprising turbulence generator means 16, 12 in the form of ribs distributed along both the inner wall 16 and the outer wall 6, which are transverse to a direction of advance of the flows, for the purpose of enhancing heat transfer and providing turbulent cooling flow.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the blade of Suzuki with turbulence generator means distributed along the inner wall and the outer wall defining the cooling ducts, with the turbulence generator means comprising a number of ribs that are transverse to a direction of advance of the flows, as taught by either Pyne or Moore, for the respective purposes of varying the flow of cooling medium and enhancing heat transfer and providing turbulent cooling flow.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki 4,697,985 in view of Moore 3,246,469. Suzuki 4,697,985 (figure 1-3 and 6) discloses a double-wall blade for a turbine substantially as claimed as set forth above, but does not disclose that the ducts comprise turbulence generator means distributed along the inner wall and the outer wall defining the cooling ducts, with the turbulence generator means comprising a number of incisions that are transverse to a direction of advance of the flows.

Moore shows a cooled turbine blade having cooling ducts 12 comprising turbulence generator means 16, 12 in the form of incisions distributed along both the inner wall 16 and the outer wall 6, which are transverse to a direction of advance of the flows, for the purpose of enhancing heat transfer and providing turbulent cooling flow.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the blade of Suzuki with turbulence generator means distributed along the inner wall and the outer wall defining the cooling ducts, with the turbulence generator means comprising a number of incisions that are transverse to a direction of advance of the flows, as taught by Moore, for the purpose of enhancing heat transfer and providing turbulent cooling flow.

Claims 1-3, 12, 14-16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable Brockmann 3,373,970 in view of either (Pyne 3,574,481 or Moore 3,246,469). Brockmann discloses a double-wall blade for a turbine, the blade comprising a streamlined lateral wall 10 extending along an axis, surrounding said axis, and in turn comprising an inner wall 12 and an outer wall 10 facing and integral with each other; and channeling means (the interior of 12) for a cooling fluid, comprising an intake cavity near 18 for intake of said cooling fluid into said blade and a number of cooling ducts (between adjacent elements 11) formed between said inner and said outer wall and tangentially to said inner and said outer wall; with the cooling ducts extending in respective directions crosswise to said axis and parallel to one another, each being airtight with respect to an adjacent duct, and having respective unnumbered intakes separate

from one another and communicating with said intake cavity so as to each guide a relative flow of said cooling fluid, which does not mix with the flow in the adjacent duct. The cooling ducts are separated and made airtight with respect to one another by baffles 11 formed in one piece with said inner and said outer wall. See column 4, lines 6-15. The baffles are disposed on respective planes at right-angles to said axis. The streamlined lateral wall 10 can be accommodated in an annular duct of said turbine, and it comprises a pair radially spaced apart end walls 14 which are disposed at the opposite axial ends of said streamlined lateral wall, transversely to said axis and in use can be connected to respective platforms which delimit said annular duct, with the channeling means comprising unnumbered opening provided through the end walls. The openings communicate with the intake cavity through the cooling ducts, and the channeling means comprises a first chamber near 17 delimited by the end walls, by the inner wall, and by a rearward wall near which separates the intake cavity, with the first chamber connecting the cooling ducts and openings. The channeling means also comprises at least one passage 20-22 which is provided in a tail portion of said blade and opens along a trailing edge 19 of said streamlined lateral wall, said cooling ducts having respective unnumbered outlets which open into said passage. The recitation in claim 1, lines 1-2 of "particularly for aeronautical applications" is a recitation of intended use as set forth above. The recitation in claim 12 that the lateral wall "can be accommodated in an annular duct of said turbine", and that the end walls "in use can be connected to respective platforms which delimit said annular duct" are recitations of intended use.

However, Brockmann does not disclose that the ducts comprise turbulence generator means distributed along the inner wall and the outer wall defining the cooling ducts, with the turbulence generator means comprising a number of ribs that are transverse to a direction of advance of the flows.

Pyne shows a cooled turbine blade having cooling ducts (between adjacent elements 18) comprising turbulence generator means 13A, 14A, and 21A in the form of ribs distributed along both the inner wall 21 and the outer wall 14, which are transverse to a direction of advance of the flows, for the purpose of varying the flow of cooling medium. Moore shows a cooled turbine blade having cooling ducts 12 comprising turbulence generator means 16, 12 in the form of ribs distributed along both the inner wall 16 and the outer wall 6, which are transverse to a direction of advance of the flows, for the purpose of enhancing heat transfer and providing turbulent cooling flow.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the blade of Brockmann with turbulence generator means distributed along the inner wall and the outer wall defining the cooling ducts, with the turbulence generator means comprising a number of ribs that are transverse to a direction of advance of the flows, as taught by either Pyne or Moore, for the respective purposes of varying the flow of cooling medium and enhancing heat transfer and providing turbulent cooling flow.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brockmann 3,373,970 in view of Moore 3,246,469. Brockmann discloses a double-wall blade for a turbine substantially as claimed as set forth above, but does not disclose that the ducts comprise turbulence generator means distributed along the inner wall and the outer wall defining the cooling ducts, with the turbulence generator means comprising a number of incisions that are transverse to a direction of advance of the flows.

Moore shows a cooled turbine blade having cooling ducts 12 comprising turbulence generator means 16, 12 in the form of incisions distributed along both the inner wall 16 and the outer wall 6, which are transverse to a direction of advance of the flows, for the purpose of enhancing heat transfer and providing turbulent cooling flow.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the blade of Brockmann with turbulence generator means distributed along the inner wall and the outer wall defining the cooling ducts, with the turbulence generator means comprising a number of incisions that are transverse to a direction of advance of the flows, as taught by Moore, for the purpose of enhancing heat transfer and providing turbulent cooling flow.

Claims 1, 12, and 14-16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morrison 6,709,230 in view of either (Pyne 3,574,481 or Moore 3,246,469).

Morrison (figures 2-4) discloses a double-wall blade for a turbine, the blade comprising a streamlined lateral wall 20 extending along an axis, surrounding said axis, and in turn comprising an inner wall 28 and an outer wall 24 facing and integral with each other; and channeling means (the unnumbered trailing edge outlet near 39) for a cooling fluid, comprising an intake cavity near 36 for intake of said cooling fluid into said blade and a number of cooling ducts 30 formed between said inner and said outer wall and tangentially to said inner and said outer wall; with the cooling ducts extending in respective directions crosswise to said axis and parallel to one another, each being airtight with respect to an adjacent duct, and having respective unnumbered intakes near 28 separate from one another and communicating with said intake cavity so as to each guide a relative flow of said cooling fluid, which does not mix with the flow in the adjacent duct. The streamlined lateral wall 20 can be accommodated in an annular duct of said turbine, and it inherently comprises a pair of radially spaced apart end walls which are disposed at the opposite axial ends of said streamlined lateral wall, transversely to said axis and in use can be connected to respective platforms which delimit said annular duct, with the channeling means comprising unnumbered openings connected to 36 which are provided through the end walls. The openings communicate with the intake cavity through the cooling ducts, and the channeling means comprises a first chamber near 36 delimited by the end walls, by the inner wall, and by a rearward wall near which separates the intake cavity, with the first chamber connecting the cooling ducts and openings. The channeling means also comprises an unnumbered passage which is provided in a tail portion 39 of said blade and opens along a trailing edge of said streamlined lateral wall, said cooling ducts having respective unnumbered outlets which open into said passage. The recitation in claim 1, lines 1-2 of "particularly for aeronautical

applications" is a recitation of intended use as set forth above. The recitation in claim 12 that the lateral wall "can be accommodated in an annular duct of said turbine", and that the end walls "in use can be connected to respective platforms which delimit said annular duct" are recitations of intended use.

However, Morrison does not disclose that the ducts comprise turbulence generator means distributed along the inner wall and the outer wall defining the cooling ducts, with the turbulence generator means comprising a number of ribs that are transverse to a direction of advance of the flows.

Pyne shows a cooled turbine blade having cooling ducts (between adjacent elements 18) comprising turbulence generator means 13A, 14A, and 21A in the form of ribs distributed along both the inner wall 21 and the outer wall 14, which are transverse to a direction of advance of the flows, for the purpose of varying the flow of cooling medium. Moore shows a cooled turbine blade having cooling ducts 12 comprising turbulence generator means 16, 12 in the form of ribs distributed along both the inner wall 16 and the outer wall 6, which are transverse to a direction of advance of the flows, for the purpose of enhancing heat transfer and providing turbulent cooling flow.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the blade of Morrison with turbulence generator means distributed along the inner wall and the outer wall defining the cooling ducts, with the turbulence

generator means comprising a number of ribs that are transverse to a direction of advance of the flows, as taught by either Pyne or Moore, for the respective purposes of varying the flow of cooling medium and enhancing heat transfer and providing turbulent cooling flow.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morrison 6,709,230 in view of Moore 3,246,469. Morrison discloses a double-wall blade for a turbine substantially as claimed as set forth above, but does not disclose that the ducts comprise turbulence generator means distributed along the inner wall and the outer wall defining the cooling ducts, with the turbulence generator means comprising a number of incisions that are transverse to a direction of advance of the flows.

Moore shows a cooled turbine blade having cooling ducts 12 comprising turbulence generator means 16, 12 in the form of incisions distributed along both the inner wall 16 and the outer wall 6, which are transverse to a direction of advance of the flows, for the purpose of enhancing heat transfer and providing turbulent cooling flow.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the blade of Morrison with turbulence generator means distributed along the inner wall and the outer wall defining the cooling ducts, with the turbulence generator means comprising a number of incisions that are transverse to a direction of advance of the flows, as taught by Moore, for the purpose of enhancing heat transfer and providing turbulent cooling flow.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over either (Pyne or Moore) in view of Japanese Patent 55-104,506. Pyne and Moore disclose double-wall blades substantially as claimed as set forth above, including inner walls and outer walls separated from one another by a distance, but do not disclose that the separation distance is equal to the thickness of at least one of said inner wall or outer wall.

Japanese Patent 55-104,506 (figures 2-4) shows a cooled turbine blade having an inner wall 17A/38A and an outer wall 12/31 separated from one another by a distance that is equal to the thickness of the inner wall and the outer wall, for the purpose of providing adequate cooling of the blade and adequate thicknesses for reduced weight.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the blade of either Pyne or Moore such that the separation distance between the inner wall and the outer wall is equal to the thickness of the inner wall and the outer wall, as taught by Japanese Patent 55-104,506, for the purpose of providing adequate cooling of the blade and adequate thicknesses for reduced weight.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pyne 3,574,481 in view of Weiler 4,314,791. Pyne discloses a double-walled blade substantially as claimed as set forth above, but does not disclose that the blade comprises pivoting portions which are

disposed on opposite axial parts of said streamlined lateral wall in order to rotate in use around the axis of the streamlined lateral wall.

Weiler (figure 1) shows a variable stator vane 1 that is cooled and that rotates around an axis of the stator vane, via pivoting portions 6, 7, for the purpose of providing adjustable flow to a turbine 36.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the blade of Pyne such that the blade comprises pivoting portions which are disposed on opposite axial parts of said streamlined lateral wall in order to rotate in use around the axis of the streamlined lateral wall, as taught by Weiler, for the purpose of providing adjustable flow to the turbine.

Claim 23 is also rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki and either (Pyne 3,574,481 or Moore 3,246,469) as applied to claim 1 above, and further in view of Weiler 4,314,791. The modified blade of Suzuki shows all of the claimed subject matter except for the blade comprising pivoting portions which are disposed on opposite axial parts of said streamlined lateral wall in order to rotate in use around the axis of the streamlined lateral wall.

Weiler (figure 1) shows a variable stator vane 1 that is cooled and that rotates around an axis of the stator vane, via pivoting portions 6, 7, for the purpose of providing adjustable flow to a turbine 36.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified blade of Suzuki such that the blade comprises pivoting portions which are disposed on opposite axial parts of said streamlined lateral wall in order to rotate in use around the axis of the streamlined lateral wall, as taught by Weiler, for the purpose of providing adjustable flow to the turbine.

Allowable Subject Matter

Claim 18 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (703)-308-2638. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (703) 308-1044. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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C.V.
October 4, 2004

Christopher Verdier
Primary Examiner
Art Unit 3745